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Chizimuzo T.C. Okoli
University of Kentucky, ctokol1@uky.edu

Ann Pederson
British Columbia Centre of Excellence for Women's Health, Canada

Steve Chasey
British Columbia Centre of Excellence for Women's Health, Canada

Anna Liwander
British Columbia Centre of Excellence for Women's Health, Canada

Andrew Johnson
University of Kentucky

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Effects of a smoke-free law in parks and beaches on smoking behaviour: Methods to determine effectiveness

Chizimuzo TC Okoli PhD, MPH, **Ann Pederson** MSc[3] **Steve Chasey,** MA[3], **Anna Liwander** MA[3] **Andrew Johnson** PhD[1],
[1]Kentucky Centre for Smoke-Free Policy, University of Kentucky, Lexington, KY USA, [3]BC Centre of Excellence for Women's Health

OVERVIEW

As part of a comprehensive approach to tobacco control, smoke free laws have resulted in reductions of indoor air pollution, improvements in respiratory and cardiovascular health, reduction of smoking uptake by youth, and increasing tobacco use cessation in various jurisdictions.

Although many studies have demonstrated the beneficial effects of smoke-free policies in indoor spaces (e.g., restaurants, bars, workplaces, hospital settings, etc.), little is known about the effectiveness of such policies in outdoor public spaces.

On September 1st, 2010, Vancouver's smoke-free by-law for the city's parks, beaches, and facilities came into effect.

The aims of this study are two-fold:

a)to examine the effect of this smoke-free law on the frequency of smoking in selected parks and beaches, and
b)to determine the change in location of smoking, within parks and beaches, following the enactment of the smoke-free law.

The hypotheses guiding this study are:

1.There will be a lower frequency of observed smoking behaviour following the introduction of the law and

2. Smoking behaviour will be dispersed to the peripheries (i.e., margins) of the parks and beaches, following the enactment of the smoke-free law.

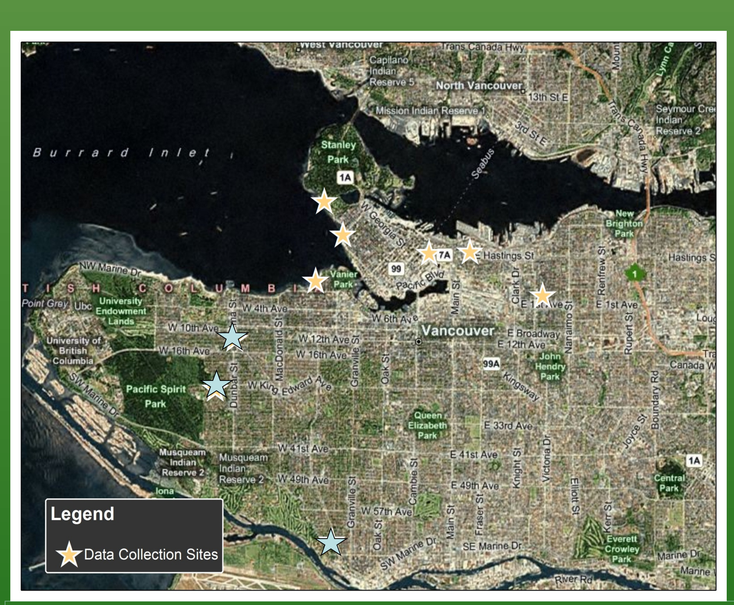

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Table 1. Observed crude smoking rates* at selected Vancouver Parks and Beaches before and after a smoke-free law

	Prelaw	1-week post-law	1-month post-law	8-month post-law	9-month post-law	10-month post-law	12-month post-law
Parks Sub-total	38.3 (SD=23.0)	24.1 (SD=7.2)	22.4 (SD=12.2)	15.1 (SD=9.7)	17.8 (SD=7.0)	10.1 (SD=13.8)	8.5 (SD=1.3)
Beaches Sub total	2.9 (SD=1.6)	4.9 (SD=1.8)	4.5 (SD=1.6)	1.3 (SD=1.2)	0.9 (SD=0.7)	0.6 (SD=0.1)	1.0 (SD=0.7)
Total (Parks and Beaches Combined)	20.6 (SD=24.3)	14.5 (SD=11.5)	13.4 (SD=12.5)	8.2 (SD=9.7)	9.3 (SD=10.3)	5.4 (SD=10.1)	4.8 (SD=4.2)

*The smoking rate at each observation time point = number of smokers in venue/number of persons in venue X 100

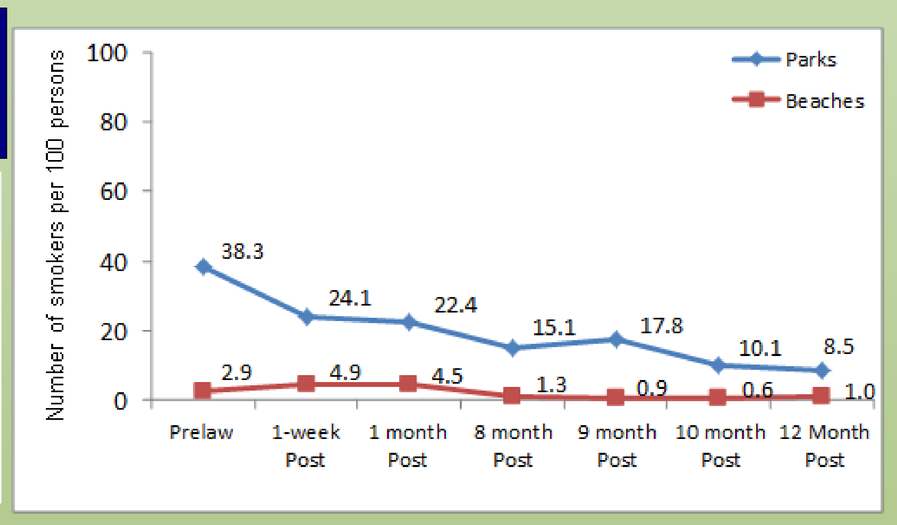

Figure 1. Changes in smoking rate in selected parks and beaches from prelaw to 12-month post law

METHODS

An observational, time series approach was employed with seven observation time-points: 2-weeks pre-law, and 1-week, 1- month, 8-month, 9-month, 10-month, and 1-year post law.

Data Collection: Observations occurred on weekends at times of frequent use in 6 venues (i.e., 3 parks and 3 beaches) in Vancouver. We obtained information on total numbers of smokers by sex during a 30 minute time period. Location of smokers was also obtained by indications on maps of the venue.

Analysis: Rates of observed smoking were calculated according to the following: (Number of smokers/total number of persons) X 100

We used mixed modeling for repeated measures to assess overall changes in smoking rate between the pre- and post-law periods with time spent in the venue and type of site (beach or park) included as variables in the model. Finally, we considered this mixed model for beaches and parks separately to assess the differential impact of the law in each type of venue. All analyses were performed using SAS 9.3 (SAS Institute Inc. (2002-2010). SAS 9.3 for Windows. Cary, NC, USA.).

The spatial analytic functions of a geographic information system (GIS) was used to calculate the distance from the given venue's centroid to smokers' locations at each observation period.

FINDINGS

There was a significant difference in smoking rates in all venues from prelaw to 12-month post-law (Prelaw mean rate =20.5 vs. 12-month mean smoking rate=4.7, F=2.6 (df =6,29) p=.036). (see figure 1).

When the analyses were stratified by venue, we found significant changes in overall adjusted smoking rates (i.e., adjusted for time spent in venues) among beaches (F=6.2 (df =6,11) p=.005) but not among parks (F=2.5 (df =6,11) p=.092); however, the differences between pre-law and 12-month smoking rates were significant in parks (Prelaw mean rate =37.1 vs. 12-month mean smoking rate=6.5, t=3.1 (df =11) p=.009) but not in beaches (Prelaw mean rate =2.9 vs. 12-month mean smoking rate=1.0, t=1.8 (df =11) p=.100).

There were no significant differences in the spatial location of smokers at the 12-month relative to the pre-law locations (see figure 2).

Figure 1. Changes in frequency of observed smoking from prelaw in selected Vancouver parks and beaches (n = 6) by observation period

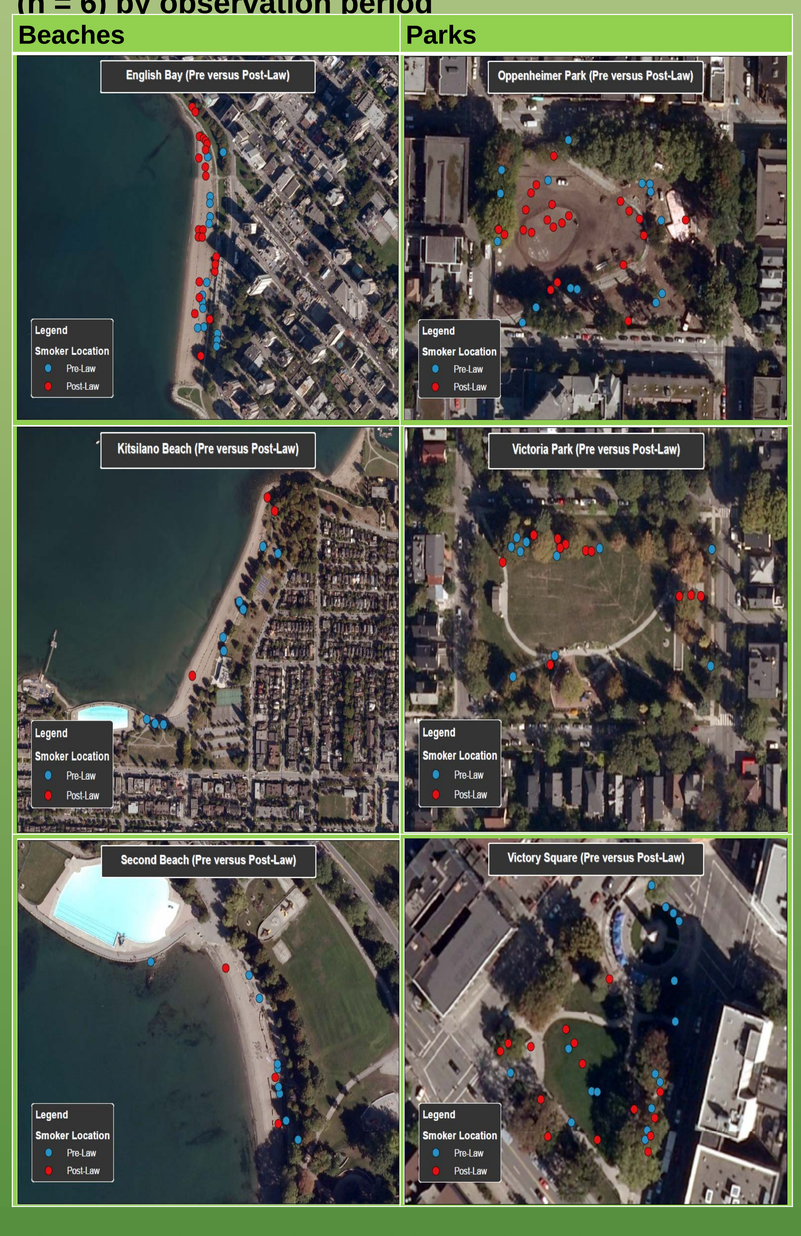

Figure 2. Changes in spatial location of smokers at prelaw vs. 12-month post-law in selected Vancouver parks and beaches

CONCLUSIONS

These findings suggest that although there were no changes in absolute rates of observed smoking behaviour, overall frequency of smoking in selected parks and beaches declined in the year after a smoke –free law was passed.

Understanding the effect of smoke-free policies in outdoor venues such as parks and beaches and developing adequate methods to measure these effects is needed.

Future studies examining the effect of smoke-free laws in different outdoor settings may be beneficial in developing sound, equitable, and enforceable health policies that can protect the public from the harms associated with tobacco use and exposure.